

REMARKS

The specification and claims have been amended. No new matter has been added to the application.

Claim 16 was objected to as being dependent upon a rejected base claim. Applicants have amended this claim to put it in independent form.

Claims 17 and 18 have been added. Each of these claims is allowable as including features not taught or disclosed in the prior art, such as the rotary impeller or fan (which feature was included in claim 16).

In the Office Action the Patent Examiner indicated that changes to inventorship were not reflected in PAIR. In a telephone conference with Patent Examiner on November 24, 2004, undersigned counsel confirmed that all requirements have been satisfied to correct inventorship under Rule 47. Applicants have checked with the Office of Petitions and been informed that a Rule 47 petition to correct inventorship is handled by the Patent Examiner (and not by the Office of Petitions).

The disclosure was objected to because a drawing heading was omitted. Applicants have amended the disclosure to insert the heading "Brief Description of the Drawings" on page 14, line 10.

Claims 1-15 were rejected under 35 U.S.C. 103(a) as being obvious over Porter et al. or Umetsu in combination with Cowen '133. Applicants have amended independent claims 1 through 3 to overcome this rejection. Applicants have amended claims 1 through 3 to add "such that, upon rotation of the surface, the reactant flows freely, by way of centrifugal force generated by rotation of the surface, across the surface as a thin film and is thrown from the periphery thereof." Claims 1 to 3 have been amended so as more clearly to specify that the reactant flows across the surface during rotation thereof as a thin film and is thrown from the periphery of the surface. Support for this amendment can be found on the specification at page 3, lines 27-34; page 17, lines 18-29.

The amendments to claims 1 to 3 are intended to distinguish over Umetsu in which the reactant does not flow across the surface during rotation and is then thrown from the periphery

thereof.

The present claims recite a reactor which is provided with a surface onto which the reactant is supplied and also a separate mesh or gauze, foam or pins or wires which increase the residence time of the reactant. None of the prior art addresses the problem of increasing residence time nor suggest features are able to prolong residence time which are not the plate itself.

Prior Art

Porter discloses a disc which has a surface shaped so as to cause perturbations in the reactant. The plate may have protrusions from the surface or indentations in the surface or the plate may be corrugated, porous or perforated. Porter does not disclose a plate which has both protrusions or indentations as well as being corrugated, porous or perforated. These features are not stated to improve a residence time, but are stated to improve mass transfer between two reactants on a surface by virtue of improved mixing.

In one embodiment disclosed in Porter, the plate itself is porous. The provision of a porous plate is to enable "a first liquid which is fed to the first surface of the plate permeates through the plate to appear on the second surface thereof and is this exposed to the second liquid or gas on both sides of the plate". The porous nature of the plate is not stated to improve residence time.

Therefore, Porter discloses that the plate itself may be modified in order to provide perturbations, and does not disclose the provision of a separate feature to increase residence time. The present invention has the advantage of being easier to manufacture than Porter, since the gauze or mesh or foam may be produced separately from the surface, whilst Porter would require expensive machining techniques when preparing the surface.

Cowen provides a spinning disc reactor. There is no suggestion or disclosure in Cowen to provide any feature which increase the effective surface area of the reactant and which increase the reactant residence time. Particularly, there is no disclosure of the specific features carrying out this task, as defined in current claims 1 to 3.

If the person of ordinary skill were to combine Cowen with Porter, he would not arrive at the present invention: the combination of Cowen and Porter would result in a spinning disc

reactor which includes a rotating plate which itself increases perturbation. The combination of the prior art would not provide a reactor which contains features aimed at increasing residence time of the reactant nor a reactant which utilizes separate gauze or mesh, pins or wires or foam in order to achieve this aim. For this reason, the present claims are inventive over the combination of Cowen and Porter.

Umetsu provides an apparatus for producing polyacetylene film. The apparatus includes a vessel which is rotatable and which includes a recess (A) that holds a Ziegler-Natta catalyst. The reactor disclosed in Umetsu is not a spinning disc reactor and therefore is in a different technological field to the present invention. For example, the apparatus provided in Umetsu is rotated only to distribute the catalyst and is stationary when the reactants are added to the reactor (see column 3, lines 27 to 33). This is contrary to the present invention, which requires rotation of the surface when the reactant is added in order to spread the reactant across the surface. Therefore, the person of ordinary skill would simply not have considered Umetsu.

Furthermore, Umetsu does not disclose the feature of claims 1 to 3 of the reactant being thrown from the periphery of the surface. Instead, in Umetsu a polyacetylene film is formed on the surface on the reactor (see column 3, lines 27 to 33) and the film is not thrown from the periphery of the surface.

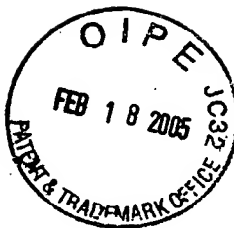
In addition, Umetsu does not provide any features which increase the effective surface area of the reactant surface and increase the reactant residence time. Thus, the person of ordinary skill would not have had a reason to consider Umetsu when contemplating the issue of increasing residence time of the reactant.

Umetsu could not be combined with either Porter or Cowen, since it relates to a different, incompatible type of technology: it is not a spinning disc-type reactor and requires that the reactant surface stops rotating when the reactant is added. This is a direct contrast to Cowen, Porter and the present invention.

For the reasons given above, the present claims are inventive over the cited prior art.

Applicant respectfully submits that the application is in condition for allowance. A Notice of Allowance is hereby respectfully requested.

Appl. No. 09/913,904
Response dated February 15, 2005
Reply to Office Action of November 15, 2004



Should the Examiner feel that a telephone conference would advance the prosecution of this application, she is encouraged to contact the undersigned at the telephone number listed below.

Applicant respectfully petitions the Commissioner for any extension of time necessary to render this paper timely.

Please charge any additional fees due or credit any overpayment to Deposit Account No. 50-0694.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: MAIL STOP AMENDMENT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the 15 day of February, 2005.

Brett A. North